

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the above-referenced application.

Listing of Claims:

1. (Currently amended) A current-drive apparatus for a display panel, comprising:

a plurality of current-drive circuits, each of said plurality of current-drive circuits including first and second terminals, a reference resistor connected between said first and second terminals and a reference current generation circuit to produce at least one internal reference current responding to a voltage generated based on the reference resistor; and

a current source, said current source and said plurality of current-drive circuits being connected such that a current flowing through said current source becomes substantially equal to a current flowing through said reference resistor of each of said current-drive circuits, wherein a current flowing through said reference resistor in a first one of said current-drive circuits flows through said reference resistor in a second one of said current-drive circuits,

wherein said current drive circuits are coupled in series in a manner that said first terminal of a preceding one of said current drive circuits is connected to the second terminal of a succeeding one of said current-drive circuits which is adjacent to the preceding one of said current-drive circuits, and

wherein at least one of said plurality of current-drive circuits further includes:

a first reference MOS transistor;

a first operational amplifier having a first input coupled to a first node between said first terminal and said reference resistor and a second input coupled to an output thereof;

a second operational amplifier having a first input coupled to a second node between said second terminal and said reference resistor, a second input coupled to a drain of

said first reference MOS transistor, and an output coupled to a gate of said first reference MOS transistor; and

at least one a current adjustment resistor connected between the drain of said first reference MOS transistor and the output of said first operational amplifier, [[and]] wherein said at least one current adjustment resistor operates such that a reference voltage generated based on a voltage at both ends of said reference resistor is applied across said at least one current adjustment resistor to generate said at least one an internal reference current through said first reference MOS transistor.

2. (Cancelled)

3. (Cancelled)

4. (Withdrawn) The current-drive apparatus according to claim 1, wherein each of said plurality of current-drive circuits comprises a voltage adjustment circuit connected to a terminal of said reference resistor on the side of a high voltage supply and wherein said plurality of current-drive circuits are configured so that when said plurality of current-drive circuits are biased, only said voltage adjustment circuit of said current-drive circuit chosen out of said plurality of current-drive circuits and located nearest to said high voltage supply has a voltage drop and the remainder of said plurality of current-drive circuits is short circuited.

5. (Withdrawn) The current-drive apparatus according to claim 4, wherein said voltage adjustment circuit comprises a high voltage terminal, a low voltage terminal, a step-down resistor connected between said high voltage terminal and low voltage terminal, and first and second MOS transistors having conduction types different from each other and connected in parallel with said step-down resistor, wherein said plurality of current-drive circuits are configured so that when said plurality of current-drive circuits are biased, only said step-down resistor of said current adjustment circuit of said current-drive circuit chosen out of said plurality of current-drive circuits and located nearest to said high voltage supply has a voltage drop and said current adjustment circuit of the remainder of said plurality of current-drive circuits becomes short circuited by turning on of at least one of said first and second MOS transistors.

6. (Currently amended) The current-drive apparatus according to claim 1, wherein said at least one of said plurality of current-drive circuits further includes:

at least one additional reference MOS transistor;

at least one additional ~~a first~~ operational amplifier having a first input coupled to said second node, a second input coupled to a drain of said at least one additional reference MOS transistor, and an output coupled to a gate of said at least one additional reference MOS transistor; and

at least one additional current adjustment resistor connected between the drain of said at least one additional reference MOS transistor and the output of said first operational amplifier, wherein at least one additional internal reference current is generated through said at least one additional reference MOS transistor. [[,]] ~~provided as a voltage follower, for outputting a voltage appearing at a terminal of said reference resistor on the side of a high voltage supply and a~~

~~plurality of second operational amplifiers, provided as a voltage follower, for outputting a voltage appearing at a terminal of said reference resistor on the side of a low voltage supply, and wherein said at least one of said plurality of current drive circuits is configured so that an output of said first operational amplifier and an output of each of said plurality of second amplifiers are applied to both ends of each of said at least one current adjustment resistor to generate corresponding one of said at least one internal reference current.~~

7. (Currently amended) The current-drive apparatus according to claim [[6]] 1, wherein said at least one of said plurality of current-drive circuits further includes a second reference MOS transistor ~~current part~~ disposed between each of said current adjustment resistor and said a low voltage supply[[,]] and is configured so that an output of corresponding one of said plurality of ~~second operational amplifiers~~ is input to ~~said reference current part~~ in order to allow said ~~corresponding one of said at least one~~ internal reference current to flow to said low voltage supply.

8. (Withdrawn) The current-drive apparatus according to claim 1, wherein each of said plurality of current-drive circuits further comprises at least one current-drive section, wherein each of said at least one current-drive section mirrors corresponding one of at least one internal reference current to generate a plurality of mirror currents and sums up a desired number of mirror currents out of said plurality of mirror currents in order to output sum of said desired number of mirror currents.

9. (Withdrawn) The current-drive apparatus according to claim 8, wherein each of said at least one current-drive section further comprises a plurality of switches corresponding to said plurality of mirror currents and operates so that said plurality of switches are selectively turned on to allow said sum up of said desired number of mirror currents.

10. (Withdrawn) The current-drive apparatus according to claim 8, wherein each of said at least one current-drive section further comprises a plurality of switches corresponding to said plurality of mirror currents and operates so that said plurality of switches are selectively turned on to allow said sum up of said desired number of mirror currents and wherein each of said plurality of current-drive circuits operates to sum up at least one set of said desired number of mirror currents and outputs sum of said at least one set of said desired number of mirror currents to said display element, thereby determining brightness of light emitted by said display element.

11. (Withdrawn) The current-drive apparatus according to claim 6, wherein a set of three sub-resistors is provided as each of said at least one current adjustment resistor so as to correspond to three primary colors and a switch circuit for selecting one of three primary colors is provided between said set of three sub-resistors and said first operational amplifier.

12. (Withdrawn) The current-drive apparatus according to claim 11, wherein said switch circuit comprises a first switch group provided between said three sub-resistors and an output of said first operational amplifier and a second switch group provided between said three sub-resistors and said non-inverting terminal of said first operational amplifier.

Claims 13 - 24 (Cancelled).

25. (Currently amended) A current-drive system for a display panel, comprising:

first and second power source lines;

a plurality of current-drive ICs, each of said plurality of current-drive ICs having first and second terminals and having a first resistor connected between said first and second terminals;

and

a current source connected to said plurality of current-drive ICs so that said ICs and said current source are connected in cascade with said first and second terminals between first and second power source lines,

wherein said ICs are coupled in series between said first power source line and said current source in such a manner that the second terminal of a preceding one of said ICs is connected to the first terminal of a succeeding one of said ICs,

~~wherein at least one of said plurality of current-drive ICs produces an internal reference voltage based on a voltage at both ends of said first resistor, and~~

wherein at least one of said plurality of current-drive ICs further includes:

a reference MOS transistor;

a first operational amplifier having a first input coupled to a first node between said first terminal and said reference resistor and a second input coupled to an output thereof;

a second operational amplifier having a first input coupled to a second node between said second terminal and said reference resistor, a second input coupled to a drain of said reference MOS transistor, and an output coupled to a gate of said reference MOS transistor;

and

a second resistor ~~having a first end coupled to one end of the first resistor and having a second end coupled to the other end of the first resistor~~ connected between the drain of said reference MOS transistor and the output of said first operational amplifier.

26. (Cancelled)

27. (Cancelled)

28. (Cancelled)

29. (Previously presented) The current-drive apparatus according to claim 1, wherein said current-drive circuit is operable to sum up the at least one internal reference current in a desired number and output a desired number of internal reference currents to a display element of said display panel.

30. (Cancelled)